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of the forest are not older than Roman times, the clays in which the forest is rooted are either coëval with or younger than the bronze age in Britain." In December, 1883, the sea tore away the beach so as to expose this clay, at the junction of which with the Trias were found hearths of trap rock with bits of pottery, grindstones, glass, tin, slag and ingots of copper, leading to the conclusion that tin was smelted and bronze made prior to the deposition of the forest clay upon the surface of the Trias rock. Submergence need not be predicated, the damming back of the sea and the growth of trees below high-water mark behind the dam furnish a probable explanation of the phenomena.

MINERALOGY AND PETROGRAPHY.[1]

AMPHIBOLE-ANTHOPHYLLITE FROM MT. WASHINGTON, BALTIMORE COUNTY.—A light-gray or brownish colored mineral, with a bronzy luster, occurs in considerable quantity as a gangue of the chalcopyrite ore which is mined a short distance north-west of the village of Mt. Washington, Baltimore county, Md. It is most frequently found in thin blade-like individuals varying much in size and with only faint indications of crystal planes. Such masses contain, beside the chalcopyrite, abundant, sharply defined octahedral crystals of magnetite. The bronzy mineral has a fibrous structure and in all respects resembles anthophyllite. During the past fall blades of unusual size ($10^{cm} \times 2^{cm}$) were found, which had the planes $\infty P \bar{\infty}$ and ∞P of the prismatic zone well developed. The angle between the planes of the prism ($124^\circ 30'$) placed the hornblendic nature of the mineral beyond a doubt. The great purity and transparency of some of the material seemed to invite a chemical and optical examination which was accordingly undertaken by Mr. C. S. Palmer, of the chemical laboratory of the Johns Hopkins University. Some specimens of a reddish-brown color were translucent—almost transparent—though 2^{mm} in thickness. In these the usual fibrous structure parallel to the vertical axis was hardly noticeable, but a parting parallel to a very flat clinodome was quite pronounced.

A chemical analysis of this freshest and most homogeneous material gave the following results:

SiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	Na_2O	K_2O	total
57.26	0.75	1.73	15.64	tr.	21.70	2.80	tr.	99.88

This will be at once recognized as the composition of a typical anthophyllite. The specific gravity is 3.068. No pleochroism is visible in thin sections, but in transparent crystals of considerable thickness a decided difference both in the color and intensity of the rays is observable. The one vibrating parallel to c is a light copper-red, while that parallel to b is yellow. Absorption $\grave{c} > \bar{b}$. No satisfactory sections parallel to the clinopinacoid for the determination of the $\breve{a}$ ray were obtained. In converged polarized light sections parallel to $\infty P \bar{\infty}$ showed one optical axis somewhat out of the field, so that only a dark brush was seen to pass as the stage was revolved. The exact measurement of the extinction in sections parallel to the clinopinacoid was not easy on account of the fibrous character of the mineral. Different values were obtained on different fibers, the largest and most frequent being from 22°–25°.

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[1] Edited by Dr. GEO. H. WILLIAMS, of the Johns Hopkins University, Baltimore.

There can therefore be no doubt that this mineral is really monoclinic in spite of its chemical composition and general resemblance to the orthorhombic anthophyllite. This fact is of interest in connection with the observations of Des Cloizeaux on an exactly similar mineral from Königsberg and Greenland, for which he first proposed the name amphibole-anthophyllite.[1] Groth has remarked that a considerable proportion of the minerals commonly called anthophyllite are probably monoclinic in their crystallization.[2] Zeparovich has recently noted the occurrence of amphibole-anthophyllite at Schneeberg in Passeyr.[3]—*G. H. Williams.*

New Planes on Hornblende Crystals.—In Vol. viii of his Materialien zur Mineralogie Russlands, 1881, N. von Kokscharow enumerates eighteen forms as heretofore observed on the mineral hornblende. Of these five only b ($\infty P \grave{\infty}$), e ($\infty P \grave{3}$), M (∞P), u ($\infty P \bar{3}$) and a ($\infty P \bar{\infty}$) belong to the prismatic zone. One other, g ($\infty P \bar{2}$) was added by Franzenau from his studies of the hornblende from Aranyerberg, in Hungary.[4]

Certain dark-green crystals of hornblende (pargasite) occurring at East Russell, St. Lawrence county, N. Y., although having but few lusterless terminal planes, possess in the prismatic zone a wealth of forms which has never before been observed on this mineral. All the above-mentioned planes, a, n, g, M, e and b, were determined by measurement, and also two others, x ($\infty P \grave{5}$) and y ($\infty P \grave{7}$). Accepting the axial ratio of von Kokscharow $a : b : c = .548258 : 1 : .293765$ — $\beta = 75° 2'$, the angle between these planes and the clinopinacoid b are

	measured	calculated
For x	159° 23′	159° 18′ 48″
For y	165° 8′	164° 54′ 20″

On these crystals, as usual, the planes a, n, M, e and b are the commonest, g and x are, however, not uncommon; y was observed on only one crystal, where it was bright and well developed.—*G. H. Williams.*

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[1] Nouvelles Recherches sur les propriétés optiques des cristaux, 1867, p. 114.

[2] Mineraliensammlung der Universität Strassburg, 1878, p. 228. Tabellärische Uebersicht der Mineralien, 1882, p. 105.

[3] "Lotos," 1883.

[4] Zeitschrift für Krystallographie, viii, 1883, p. 568.

LEUCITE.—Professor H. Rosenbusch[1] of Heidelberg, has recently made the most interesting observation that the morphological no less than the optical characters of the mineral leucite can be brought into full accord with the regular system by a sufficient increase of temperature. It is well known that this mineral was regarded as the very type of an isometric icosatetrahedron until vom Rath showed that considerable variation from the calculated angles as well as frequent twinning lamellæ parallel the face ∞O necessitated the assumption of a tetragonal symmetry. The double refraction of this substance was also a point in favor of this view. The recent studies of Klein, Merian and Penfield have, however, shown that above a certain temperature leucite, like boracite, becomes altogether isotropic and now Rosenbusch finds that by the same means the twinning lamellæ, ordinarily visible as a system of fine striations, may likewise be made to disappear. A crystal upon which these were unusually distinct was brought in focus under the microscope by reflected light in such a manner that the main face appeared bright while the lamellæ were in the shadow. Heat was now gradually applied and the most remarkable effect observed. A kind of undulatory motion was noticed and whole groups of lamellæ would disappear at one point and reappear at another, until finally, at the requisite temperature, all were gone and the face was seen to be quite uniform and even. Upon cooling the lamellæ returned but in a different position from that which the original ones occupied. So great was the molecular disturbance here produced, that after some repetitions of the experiment on the same crystal it fell to pieces. The supposition is made that leucite crystallizes in the regular system at high temperatures, and in some other unknown system at ordinary temperatures. The effort of the molecules to suit their arrangement to the altered conditions produces a tension which finds relief in the formation of secondary twinning lamellæ parallel to the slipping plane ("gleitfläche"), which in this case is ∞O. When the temperature is raised this tension is of course removed. The attempt will be made by the same investigator to measure a crystal of leucite on a reflection goniometer at the temperature necessary for the obliteration of the twinning lamellæ, when it is expected that the interfacial angles will agree perfectly with the regular symmetry.

BOTANY.[2]

THE ABUNDANCE OF ASH RUST.—In Eastern Nebraska, this year has been remarkable for the great abundance of the ash rust (*Æcidium fraxini*) upon the leaves, petioles and twigs of the green ash. In many instances each leaflet contained from ten to

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[1] Neues Jahrbuch für Min., etc., 1885. II, p. 1.

[2] Edited by PROFESSOR CHARLES E. BESSEY, Lincoln, Nebraska.